


## Letter to the Editor

# The use of survey-driven feedback to improve antimicrobial stewardship efforts at a single center

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*To the Editor*—Antimicrobial stewardship has been shown to improve outcomes, reduce costs, and decrease antimicrobial resistance.<sup>1–3</sup> However, the optimal method for performing antimicrobial stewardship has yet to be elucidated and is likely specific to each institution. Loyola University Medical Center (LUMC) is a quaternary care-system that has a comprehensive multidisciplinary antimicrobial stewardship program (ASP). LUMC ASP has primarily employed a formulary restriction and preauthorization process as the foundation of its ASP. Evidence is mounting that a multifaceted approach should be implemented to improve antimicrobial stewardship by focusing on providers' prescribing behaviors.<sup>1,4</sup> Several surveys have been conducted to assess physicians' knowledge and attitudes on antimicrobial stewardship and antimicrobial resistance to formulate strategies that can promote behavioral changes.<sup>5–7</sup> Surveys have also been used to obtain feedback and gauge efficacy of implemented strategies.<sup>8,9</sup>

In January 2018, a self-reported online survey was created and disseminated to approximately 1,559 providers at LUMC electronically: 817 attending physicians, 610 house staff (interns, residents and fellows), and 132 nurse practitioners. The primary objective of the survey was to evaluate baseline knowledge and perception of antimicrobial stewardship and antimicrobial resistance, as well as to solicit feedback on current antimicrobial stewardship practices at LUMC. This study was approved by the LUMC investigational review board, and participation was voluntary. In total, 167 providers participated: 91 house staff (55%), 47 attending physicians (28%), and 29 advanced practice nurses (APNs, 17%). The survey response rate was 11% for providers overall, including 15% for house staff, 6% for attending physicians, and 22% for APNs. Most respondents were from medical services or medicine subspecialties. More than 95% of providers were aware that inappropriate use of antimicrobials can be harmful to patients and that antimicrobial stewardship can decrease antimicrobial resistance (Fig. 1). Attending physicians were more familiar with stewardship practices at LUMC

compared to APNs and house staff, and they were more likely to recognize that antimicrobial resistance is a problem here. Those from surgical services were less likely to be familiar with antimicrobial stewardship practices, and those from medicine were most likely to want help or feedback with drug dosing. Providers responded that the following methods are helpful for improving appropriate antimicrobial use: facility management guidelines (29%), feedback on selection of antimicrobials and duration of therapy (25%), formal lectures (18%), newsletters (15%), mandatory health stream modules (10%), and restricting more antimicrobials (3%).

Based on the results of the survey, our antimicrobial stewardship team implemented the following changes to the ASP in June 2018: (1) removed prior authorization of cefepime, piperacillin-tazobactam and vancomycin; (2) required documentation of indication and duration of therapy upon order entry in the electronic medical record for the following antibiotics: aztreonam, cefepime, ceftazidime, daptomycin, ertapenem, linezolid, meropenem, piperacillin-tazobactam, and vancomycin; (3) implemented a pharmacist-driven antibiotic review within 48–72 hours of ordering; and (4) provided education to all providers via newsletters and lectures.

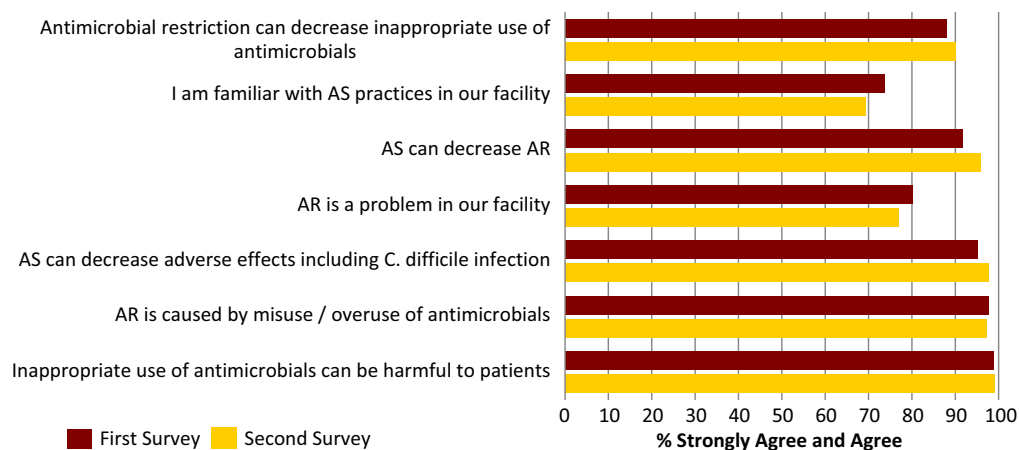
In January 2019, a second survey was distributed to all providers with the primary goal of evaluating changes to providers' knowledge and perception of antimicrobial stewardship and antimicrobial resistance after these modifications. In total, 173 providers responded to the survey: 97 attending physicians (56%), 58 house staff (34%), and 18 APNs (10%). The response rate of the second survey was 11% overall, including 9% for house staff, 12% for attending physicians, and 14% for APNs. Awareness of the harmful effects of inappropriate use of antimicrobials remained high across the 3 types of respondents. However, unfamiliarity with antimicrobial stewardship practices remains an issue. Overall, there were no significant changes between the results of the first and second surveys (Fig. 1).

Feedback on unrestricting cefepime, piperacillin-tazobactam, and vancomycin was also included in the second survey. Approximately 60% of the respondents agreed that unrestricting these agents improved their workflow, and 45% felt that this led to the likelihood of misuse or overuse of these agents by providers in general, but only 8% believed that this led to an increase in their personal use. Only 19% agreed that this intervention caused them to de-escalate from broad-spectrum to narrow-spectrum agents, but almost 40% felt that this has decreased their overall number of infectious disease consultations.

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**Fig. 1.** Perception and knowledge on AS and AR.

Finally, we used this survey to obtain feedback on requiring indications for selected antibiotics upon order entry in our electronic health record (EHR). Also, 83% of the providers agreed that requiring indications provided an opportunity for antibiotic use optimization, and 64% thought that this made them think twice about whether their patients really needed antibiotics. Fewer than 40% felt that this intervention slowed down their workflow, and <30% agreed that the list was too long and cumbersome. However, only 35% agreed that this project should be expanded to include all antimicrobials.

This study has some limitations. As with all self-reported surveys, the major disadvantage is discrepancy due to recall inaccuracy. Our response rate was also low, which may have affected the validity of our survey. Finally, as both surveys were anonymous, we could not accurately determine significant changes between the surveys.

In conclusion, hospital-specific surveys on providers' perceptions and knowledge of antimicrobial stewardship and antimicrobial resistance can be used to guide future ASP interventions, as well as to evaluate the effectiveness of these interventions. Our ASP at LUMC implemented strategies to improve provider education and engagement in antimicrobial stewardship and evaluated this strategy using a before-and-after survey. Surveys will continue to be utilized in assessing ASP interventions and educational efforts at LUMC.

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